Claims:

1. A device for separating very small particles by size, comprising, in combination, a cryogenic chamber within which particle travel and separation can occur, a loading chamber connected to the cryogenic chamber for loading particles into the cryogenic chamber, and a collector device connected to the cryogenic chamber for collecting at least some of the particles after they have been separated by size.

2. A device according to claim 1 further including a device for indicating the size of the particles as the particles move through the cryogenic chamber.

3. A device according to claim 1 wherein said cryogenic chamber is adapted to produce and maintain a column of very low viscosity, high wetting fluid.

4. A device according to claim 1 further including a superfluid within said cryogenic chamber.

5. A device according to claim 4 wherein said superfluid is a liquid.

6. A device according to claim 5 wherein said liquid is helium.

7. A device according to claim 6 wherein said helium is 4He.

8. A device according to claim 1 wherein said cryogenic chamber is adapted to produce an internal temperature of lower than 2.2 degrees Kelvin.

9. A device according to claim 1 further including a discard conduit for drawing off particles to be discarded.

10. A device according to claim 1 further including a harvest conduit for drawing off particles to be harvested.

11. A device according to claim 1 further including a discard conduit for drawing off particles to be discarded, a harvest conduit for drawing off particles to be harvested, and an actuator for actuating a flow of fluid in the discard conduit and a flow of fluid in the harvest conduit at different times.

12. A device according to claim 1 wherein said loading chamber includes a receiver for receiving the particles to be separated and for loading the particles into said cryogenic chamber.

13. A device according to claim 12 further including a gate valve interposed between said receiver and said cryogenic chamber for controlling the flow of particles from the loading chamber to the cryogenic chamber.

14. A device according to claim 12 wherein said loading chamber further includes a vacuum conduit for drawing air from the receiver.

15. A device according to claim 12 wherein said loading chamber further includes a delivery conduit for delivering helium to the receiver.

16. A device according to claim 13 further including a delivery conduit extending from the receiver into the cryogenic chamber by a sufficient distance that the particles flowing from the receiver and the gate valve are deposited within superfluid in the cryogenic chamber.

17. A device according to claim 1 wherein said collector device includes a diverter for diverting a flow of particles to be discarded from a flow of particles to be harvested.

18. A device according to claim 1 further including a laser generator positioned to direct a beam of laser light through the cryogenic chamber so as to illuminate any particles therein.

19. A device according to claim 18 further including a detection device for detecting a diffraction pattern of light created by said illumination of particles within the cryogenic chamber.

20. A device according to claim 19 further including recognition apparatus for detecting and distinguishing between various diffraction patterns of light created by said illumination of particles within the cryogenic chamber, and for generating different signals in response to the detection of different diffraction patterns.

21. A device according to claim 20 further including means connecting the recognition apparatus to a diverter mechanism for diverting a flow of particles of a predetermined sizes from a flow of particles of other sizes.

22. A method of sorting very small particles by size, comprising the steps of
providing a column of very low viscosity high wetting fluid,
introducing a plurality of particles of various sizes into the fluid in the column,
causing the particles to travel through the fluid so as to separate the particles by size, and
harvesting the separated particles of desired size.

23. A method according to claim 21 including the steps of causing the particles to travel through the fluid toward at least one collecting point, and harvesting at least some particles at the collecting point.

24. A method according to claim 22 wherein the step of providing a column of very low viscosity high wetting fluid includes the step of providing a superfluid.

25. A method according to claim 22 wherein the step of providing a superfluid includes the step of providing a helium superfluid.

26. A method according to claim 22 further including the steps of illuminating the particles traveling through the fluid, creating diffraction patterns by the illumination of the particles, and distinguishing between particles of different sizes by differences in said diffraction patterns.

27. The method according to claim 22 further including the steps of loading particles into a loading chamber receiver and drawing air from the loading chamber receiver before introducing the particles into the cryogenic chamber.

28. The method according to claim 27 further including the steps of introducing gaseous helium into the loading chamber receiver after at least some air is drawn from the loading chamber receiver.

29. A method according to claim 22 further including the step of drawing particles to be harvested from the cryogenic chamber.

30. A method according to claim 22 further including the step of drawing particles to be discarded from the cryogenic chamber.

31. A method according to claim 22 further including the steps of drawing particles to be harvested from the cryogenic chamber at a predetermined time, and drawing particles to be discarded from the cryogenic chamber at a different time.

32. A batch of particles of predetermined sizes which have been selected by the method of claim 31.

33. A batch of particles wetted by helium.

34. A superfluid having therein a plurality of very small particles.

35. A combination according to claim 34 wherein at least some of said particles are less than 40 microns in size.

36. A combination according to claim 34 wherein at least some of said particles are less than 2 microns in size.

37. A combination according to claim 33 wherein said helium is in a superfluid state..

38. A combination according to claim 33 wherein said helium has a temperature of less than 2.2 degrees Kelvin.

39. A combination according to claim 34 wherein said superfluid is contained in a vertically elongated chamber.

40. The use of a superfluid helium to separate and sort particles.

41. The use according to claim 40 wherein said superfluity is helium.

42. The use of helium to separate and sort particles.